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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,133	07/02/2003	Mervyn John Miles	SHP-PT077	3323

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VOLPE AND KOENIG, P.C.  
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EXAMINER
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LUU, THANH X

ART UNIT	PAPER NUMBER
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2878

MAIL DATE	DELIVERY MODE
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01/03/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/612,133

Applicant(s)

MILES ET AL.

Examiner

Thanh X. Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 December 2007 and 31 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-19, 21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-19, 21 and 23-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2007 and December 6, 2007 has been entered.

Claims 2-19, 21 and 23-25 are currently pending.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2-19, 21, 23 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

4. It is unclear how one of ordinary skill in the art would "to form an image corresponding to variations of the measured parameter during each oscillation." Applicant asserts that this is patentable subject matter, but fails to explain how this is accomplished.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Regarding claim 25, "the width of the raster scan area" lacks proper antecedent basis. It is unclear how many scan areas are in the invention. Furthermore, it is unclear what "scan area width" refers to.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 21 and 23, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Betzig (U.S. Patent 5,254,854).

Regarding claim 23, Betzig discloses (see Figs. 1 and 8) a scanning probe microscope and method for scanning a sample by means of interaction between the sample and the probe, comprising: driving means (50, 40) arranged to provide relative motion between the probe and the sample surface and capable of bringing the same and probe into close proximity; means for oscillating (40) either the probe or the sample in order to provide relative oscillatory motion (160; see Fig. 8 and col. 3, lines 10-12) of the probe across the surface; and at least one of a probe detection mechanism (80)

arranged to measure at least one parameter indicative of strength of the interaction between the probe and the sample for imaging the sample; the microscope is arranged, in operation, to carry out a scan of the sample surface wherein scan area is covered by an arrangement of scan lines (see generally Fig. 8), each scan line (not shown; created by dithering) provided by laterally oscillating (see col. 3, lines 10-12) either the probe or the sample near resonant frequency (see col. 3, lines 25-30). The oscillation amplitude inherently determines a maximum scan line length. The scan line is continuously read by the detector (see col. 5, line 60- col. 6, line 5; the position-sensitive optical detector is sensitive to the dither motion). Since shear force imaging generates an image (see Fig. 14; col. 3, line 21; col. 6, line 9; col. 6, line 38; col. 8, line 25; and claim 13), an image is formed corresponding to variations of the measured parameter (shear force) during each oscillation.

Regarding claim 21, Betzig discloses the claimed invention as set forth above. Betzig further discloses (see col. 5, lines 35-50) monitoring a parameter (shear force) and adjusting the separation distance (height of the tip above the sample) in order to drive the value of the monitored parameter back towards the set value (constant shear force).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 12-18, 24 and 25, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Betzig in view of Elings (U.S. Patent 6,008,489).

Regarding claims 3, 12, 14, 17, 18, 24 and 25, Betzig discloses the claimed invention as set forth above. Betzig also disclose (see col. 3, lines 10-15) the parameter is an oscillation amplitude; and (see Fig .8) scanning a rectangular area as claimed. The scan in Betzig is also raster scanned. Since the raster scan in Betzig is further dithered, as understood, each scan line is a "component" of the raster scan. Betzig does not specifically disclose responding to a variation in an average value of the at least one parameter. Elings et al. teach (see claim 48) averaging values. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide average values in the apparatus and method of Betzig in view of Elings et al. to provide more accurate and precise adjustment and detection.

Regarding claims 13 and 15, Betzig in view of Elings et al. disclose the claimed invention as set forth above. Betzig and Elings et al. do not specifically disclose a tuning fork as claimed. However, choosing a particular type of oscillator is a matter of design choice. Furthermore, tuning forks are notoriously well known in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose a tuning fork as claimed in the apparatus and method of Betzig in view of Elings et al. to provide more stability as well known.

Regarding claim 16, Betzig in view of Elings et al. disclose the claimed invention as set forth above. Betzig and Elings et al. do not specifically disclose a time constant

as claimed. However, choosing a particular time constant is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose time constant values as claimed in the apparatus and method of Betzig in view of Elings et al. to sufficiently react to changing conditions and obtain improved detection.

10. Claims 2-4, 6-19, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kley (U.S. Patent 6,752,008) in view of Betzig and Elings et al.

Regarding claims 3, 7-12, 14, 17-19, 21 and 24, Kley discloses (see Figs. 1 and 3) a scanning probe microscope and method for scanning a sample by means of interaction between the sample and the probe, comprising: driving means (22) arranged to provide relative motion between the probe and the sample surface and capable of bringing the same and probe into close proximity; means for oscillating (18) either the probe or the sample in order to provide relative oscillatory motion (see Fig. 3) of the probe across the surface; and at least one of a probe detection mechanism (24) arranged to measure at least one parameter indicative of strength of the interaction between the probe and the sample for imaging the sample; the microscope is arranged, in operation, to carry out a scan of the sample surface wherein scan area is covered by an arrangement of scan lines (see Fig. 3), each scan line provided by laterally oscillating either the probe or the sample at a frequency. The oscillation amplitude inherently (see Fig. 3) determines a maximum scan line length. Kley also discloses (see Figs.) an AFM cantilever and actuator as claimed. An image (see Fig. 12) is formed as claimed. Kley does not specifically disclose a feedback mechanism or

oscillating at or near a resonant frequency. Betzig teaches (see col. 3, lines 25-30 and col. 5, lines 35-50) oscillating a resonant frequency and providing feedback as claimed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide feedback and oscillate a resonant frequency in the apparatus and method of Kley in view of Betzig for improved stability. Kley also does not specifically disclose responding to a variation in an average value. Elings et al. further teach (see claim 48) averaging values. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide average values in the apparatus and method of Kley in view of Betzig and Elings et al. to provide more accurate and precise adjustment and detection.

Regarding claims 2 and 4, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley does not specifically disclose measuring capacitance. Elings et al. further teach (see col. 1, line 26) that it is conventional to measure deflection by measuring capacitance. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to measure capacitance in the apparatus and method of Kley in view of Betzig and Elings et al. as desired for efficient and effective deflection detection.

Regarding claim 6, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley does not specifically disclose measuring a magnetic field. Elings et al. further teach (see col. 2, lines 35-40) that it is conventional to use such probes to measure magnetic fields. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to measure magnetic fields



in the apparatus and method of Kley in view of Betzig and Elings et al. to provide further functionality as desired.

Regarding claims 13, 15, 18 and 19, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose a tuning fork as claimed. However, choosing a particular type of oscillator is a matter of design choice. Furthermore, tuning forks are notoriously well known in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose a tuning fork as claimed in the apparatus and method of Kley in view of Betzig and Elings et al. to provide more stability as well known.

Regarding claim 16, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose a time constant as claimed. However, choosing a particular time constant is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to choose time constant values as claimed in the apparatus and method of Kley in view of Elings et al. to sufficiently react to changing conditions and obtain improved detection.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kley in view of Betzig and Elings et al., and further in view of Ookubo (U.S. Patent 6,614,227).

Regarding claim 5, Kley in view of Betzig and Elings et al. disclose the claimed invention as set forth above. Kley, Betzig and Elings et al. do not specifically disclose the specific capacitance probe detection mechanism as claimed. Ookuba teaches (see

Fig. 9) a capacitance probe detection mechanism having a resonator (101) and voltage modulator (201, 202) as claimed. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide such a configuration as claimed in the apparatus and method of Kley in view of Betzig and Elings et al. to effectively implement capacitance detection as desired for deflection detection.

***Response to Arguments***

12. Applicant's arguments filed December 6, 2007 have been fully considered but they are not persuasive.

13. First, Examiner notes the language of the claims can be interpreted in this manner: wherein the microscope is further arranged to form an image corresponding to (variations of the measured parameter during each oscillation). The parentheses denote how "during each oscillation" modifies variations.

14. Applicant asserts that Betzig only discloses shear-force sensing. Examiner disagrees. Betzig discloses shear-force imaging at numerous places (see Fig. 14; col. 3, line 21; col. 6, line 9; col. 6, line 38; col. 8, line 25; and claim 13) throughout the disclosure. It is unclear how Betzig's imaging does not read on "an image corresponding to variations of the measured parameter during each oscillation."

15. Applicant asserts that "shear force measurement is not part of the image." Examiner disagrees. Betzig specifically mentions (see above) shear-force imaging. It is unclear how shear-force is not part of the image.

16. Applicant also asserts that the dither oscillations of Betzig do not extend across the width of the scan area. Examiner disagrees. The scan area as defined by the claim

"is covered by an arrangement of scan lines." The scan area as interpreted by the Examiner is not the area covered by the lines 170, rather the area covered by the dither oscillations 160. As the probe dithers it covers the scan area. E.g. /VV\

17. Applicant's remarks with regard to Kley are found to be not persuasive as Applicant has failed to specifically point out why Kley does not disclose the claimed invention.

18. Thus, as set forth above, this rejection is proper.

#### ***Conclusion***

19. This is an RCE of applicant's earlier application. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is 571-272-2441. The examiner can normally be reached on M-F 6:00AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thanh X Luu/  
Primary Examiner  
Art Unit 2878

12/2007